

What is claimed is:

1. A catheter for percutaneous insertion comprising:  
a sheath portion with a lumen extending therein,  
5 an insertion member disposed slidably in the lumen of  
said sheath portion and provided with a distal end portion  
capable of protruding from a distal end portion of said sheath  
portion,  
an injection needle disposed in the distal end portion  
10 of said insertion member for injecting a therapeutic  
composition to a target tissue, and  
paired electrodes disposed in a distal end portion of  
the catheter for measuring impedance.
2. A catheter as claimed in claim 1, wherein said paired  
15 electrodes are disposed in the distal end portion of said  
insertion member.
3. A catheter as claimed in claim 2, wherein at least  
one of said paired electrodes is separated by not less than  
1 mm from a leading end of a bevel of said injection needle  
20 relative to a longitudinal direction of said insertion member.
4. A catheter as claimed in claim 2, wherein said paired  
electrodes exist in a plurality of sets which are positioned  
as separated relative to a longitudinal direction of said  
insertion member.
- 25 5. A catheter as claimed in claim 4, wherein at least  
one of the electrodes composed of said plurality of sets of  
paired electrodes is parted by not less than 1 mm from a leading  
end of a bevel of said injection needle relative to the  
longitudinal direction of said insertion member.
- 30 6. A catheter as claimed in claim 1, wherein one of said  
paired electrodes is positioned at the distal end portion  
of said insertion member and the other of said paired electrodes

is positioned in the distal end portion of said sheath portion.

7. A catheter as claimed in claim 6, wherein said electrode positioned in the distal end portion of said insertion member is parted by not less than 1 mm from a leading  
5 end of a bevel of said injection needle relative to a longitudinal direction of said insertion member.

8. A catheter as claimed in claim 6, wherein said paired electrodes exist in a plurality of sets and electrodes disposed in the distal end portion of said insertion member are  
10 positioned as individually parted relative to a longitudinal direction of said insertion member.

9. A catheter as claimed in claim 8, wherein at least one of electrodes disposed in the distal end portion of said insertion member is separated by not less than 1 mm from a  
15 leading end of a bevel of said injection needle relative to the longitudinal direction of said insertion member.

10. A catheter as claimed in claim 1, wherein the distal end portion of said sheath portion is provided with a through-hole communicating with the lumen of said sheath  
20 portion.

11. A catheter as claimed in claim 10, wherein said through-hole is separated by not less than 1 mm from an end face of the distal end portion of said sheath portion relative to a longitudinal direction of said insertion member.

25 12. A catheter as claimed in claim 1, wherein said target tissue is a heart.

13. A catheter system comprising:

a catheter for percutaneous insertion including a sheath portion with a lumen extending therein, an insertion member  
30 disposed slidably in the lumen of said sheath portion and provided with a distal end portion capable of protruding from a distal end portion of said sheath portion, and an injection

needle disposed in the distal end portion of said insertion member for injecting a therapeutic composition to a target tissue,

5 paired electrodes disposed in a distal end portion of said catheter for measuring impedance, and

a puncture detecting device to which conductors extending from said paired electrodes are able to be connected for detecting a puncture by said injection needle based on impedance values measured by said paired electrodes.

10 14. A catheter system as claimed in claim 13, wherein one of said paired electrodes is positioned more toward a proximal end side of said catheter than the other of said paired electrodes.

15 15. A method for injecting a therapeutic composition with a catheter including a sheath portion with a lumen extending therein, an insertion member disposed slidably in the lumen of said sheath portion and provided with a distal end portion capable of protruding from a distal end portion of said sheath portion, an injection needle disposed in the  
20 distal end portion of said insertion member for injecting a therapeutic composition to a target tissue, and paired electrodes disposed in a distal end portion of the catheter for measuring impedance, said method comprising the steps of:

25 (a) inserting said catheter into a living body and advancing it to a neighborhood of the target tissue, and

(b) puncturing the target tissue with said injection needle based on impedance values measured by said paired electrodes and injecting the therapeutic composition into  
30 the target tissue through said injection needle.

16. A method as claimed in claim 15, wherein said step (b) comprises the steps of continuing measurement of impedance

with said paired electrodes, moving said insertion member in a distal end direction relative to said sheath portion, protruding said injecting needle from the distal end portion of said sheath portion to puncture the target tissue, and  
5 injecting the therapeutic composition through said injection needle into the target tissue after a change is detected in the impedance values as measured by said paired electrodes.